

Abstract No. ling131

**Crystal Structure of a Y-family DNA Polymerase in Action: A Mechanism for Error-Prone and Lesion-Bypass Replication**

H. Ling<sup>1</sup>, F. Boudsocq<sup>2</sup>, R. Woodgate<sup>2</sup> and W. Yang<sup>1</sup>

<sup>1</sup>Laboratory of Molecular Biology, National Institute of Diabetes and Digestive and Kidney Diseases

<sup>2</sup>Section on DNA Replication, Repair and Mutagenesis, National Institute Of Child Health and Human

Development, NIH,

Beamline(s): X9B

*Sulfolobus sulfataricus* P2 DNA polymerase IV (Dpo4) is a DinB homolog that belongs to the recently described Y-family of DNA polymerases, which are best characterized by their low-fidelity synthesis of undamaged DNA templates and propensity to traverse normally replication-blocking lesions. Crystal structures of Dpo4 in ternary complexes with DNA and an incoming nucleotide, either correct or incorrect, have been solved at 1.7 Å and 2.1 Å resolution, respectively. Despite a conserved active site and a hand-like configuration similar to all known polymerases, Dpo4 makes limited and nonspecific contacts with the replicating basepair thus relaxing base selection. Dpo4 is also captured in the crystal translocating two template bases to the active site at once, suggesting a possible mechanism for bypassing thymine dimers.